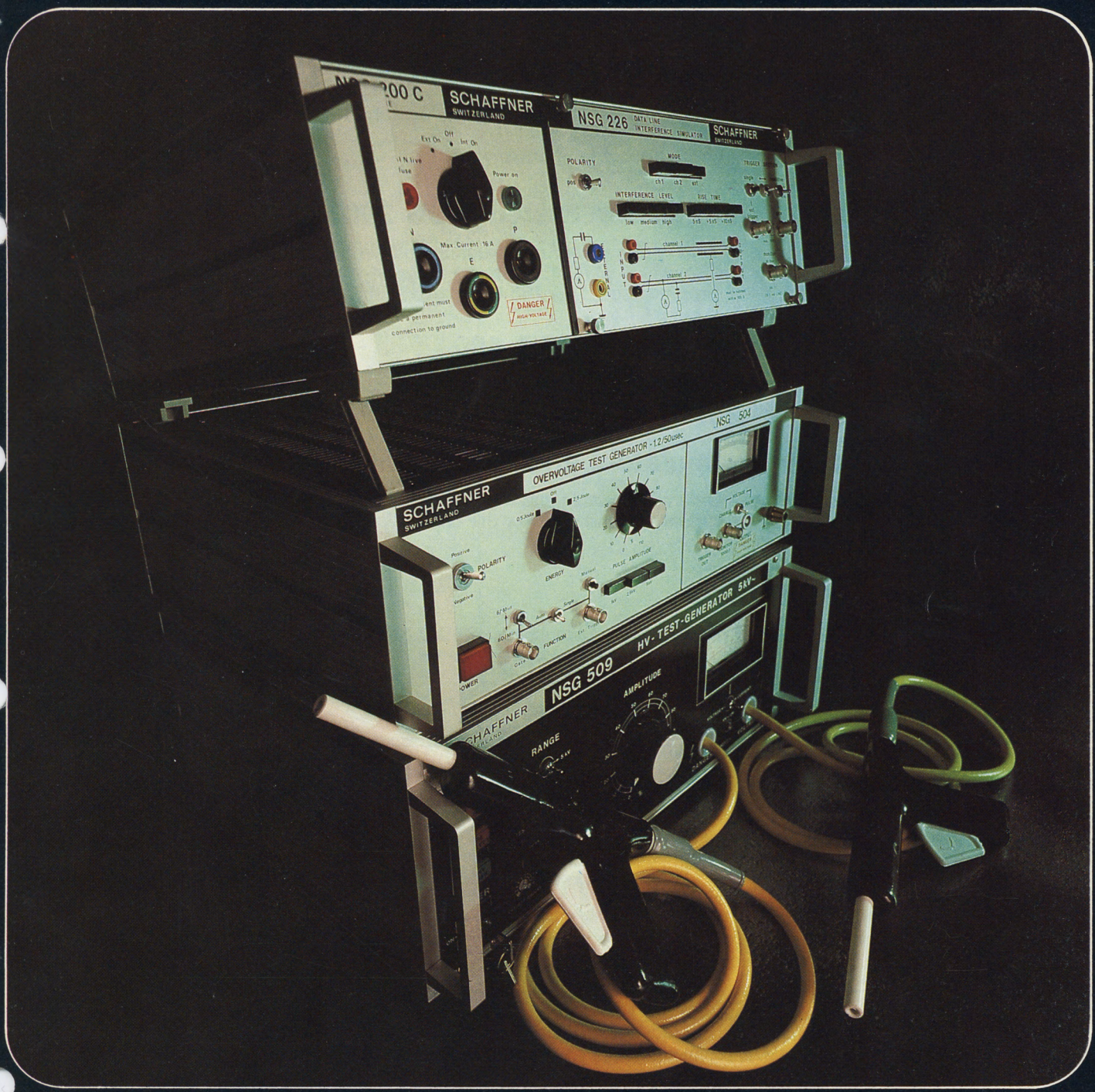
Interference simulators

High voltage testers



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Short form catalogue

The simulation of line interference

Line interference voltage superposed on power lines, short power interruption as well static discharges impose malfunctioning of electronic circuits and equipments. The goal of the simulation of line interference is the reproducible generation of interference pulses to guarantee the practical serviceability of equipment and systems.

For investigation and improvement of the susceptibility several equipment are available which simulate the following practical interferences:

1. Power-failures or interruption how they are generated through switching in power plants.

2. Interference pulses superposed on power lines
   - high energy and slow rise time (300 ns) how they are generated i. e. through switching of large inductive loads.
   - medium energy and medium rise time (35 ns) how they are generated i. e. through switching of fast power switches.
   - low energy and fast rise time (5 ns) how they are generated i. e. through switches and relays

3. Static discharge caused through touching of equipment.

Line interference simulation system NSG 200

The NSG 200 interference system is of modular construction and permits the simulation of nearly all power line interference including the simulation of AC / DC breaks and static discharges. With the system the tests accordingly to the EEC norm proposal com (78) 766 final can be realized.

Line interference simulators NSG 400

The goal of this compact equipment is an inexpensive and simple simulation of the most popular interference pulses. Additional functions as they are available in the NSG 200 system are droped deliberately.

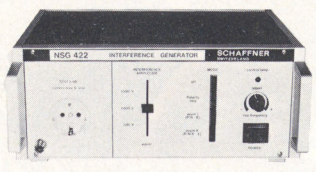
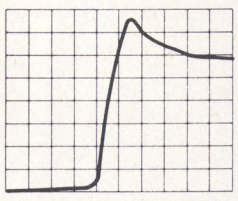
Line interference simulators and high voltage generators NSG 500

These generators generate interference pulses and high voltage pulses for tests of components and equipments according to international standards. For the car industrie an interference simulator is available for testing the car electronic.

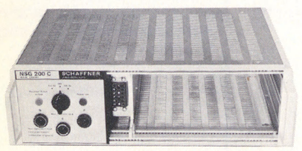
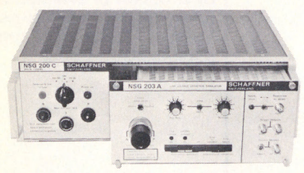
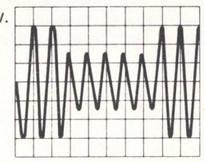
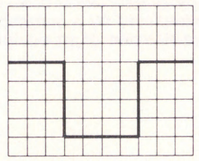
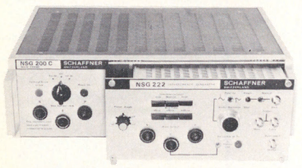
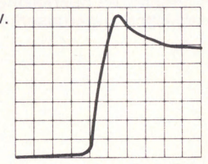
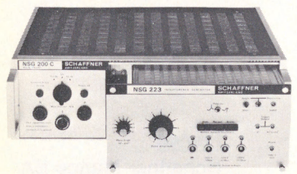
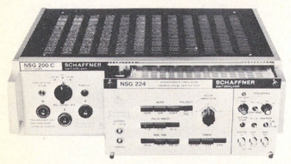
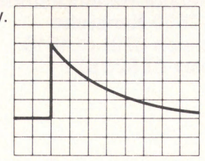
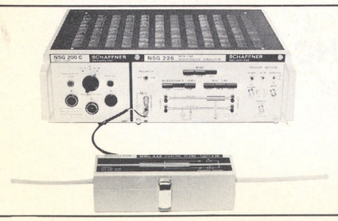
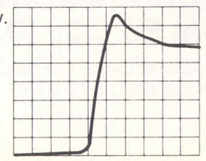
High voltage tester

The equipment NSG 509 permits the test of insulation with AC on systems and equipment up to a leakage current of 100 mA according to international standards.

Interference simulators NSG 400

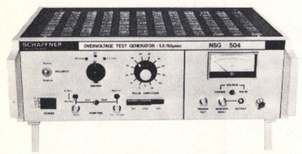
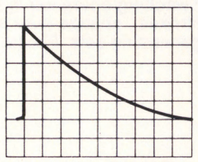
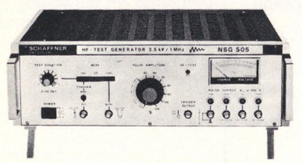
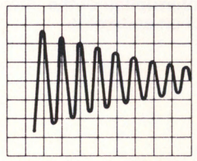
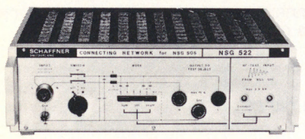
Type	Picture	Interference pulsform	Technical datas
NSG 422		 200V/Div. 5 ns/Div.	Pulse rise time: 5 ns (10 ÷ 90%) Pulse width: 100 ns (at 50%) Pulse amplitude: 300 ÷ 1600 V_p Pulse energy: 0,5 mJ on 200 Ω
	Practical interference	**Noise source**	**Effects**
	Fast and low energy noise peaks superposed on the power line.	Electromechanical switching near the interfered equipment like relays contacts, mechanical over switches, typewriters, calculators.	Errors of fast logic IC circuits or destruction of sensitive electronic circuits. Malfunctions up to destruction of electronic circuits. All technologics as TTL, CMOS etc.

Interference simulators NSG 200

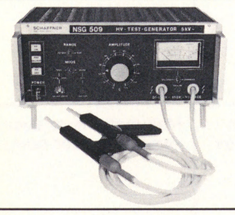
Type	Picture	Interference pulsform	Technical Datas	Practical interference	Noise source	Effects
NSG 200 C **NSG 200 D**			Power supply: 200 C: 220/240V 50 Hz 2 A 200 D: 110V 60 Hz Max. output voltage: 240V Max. output current: 16 A / DC, 50 Hz, 6 A / 400 Hz Dimensions: 435 x 150 x 305 mm			
NSG 203 A		100V/Div.  20 ms/Div.	Max. current: 15 A / 50 Hz 16 A / 400 Hz Max. voltage: 600V / AC (over load) Disruption: 1,5 ms ... 500 ms Change of power voltage: 10 ms ... 5 s Cycle of changes: 0,6 ... 25 s	With this modul to the NSG 200 System and an external variable transformer short changes or breaks of the power voltage can be simulated i. e. breakdown of power voltage from 220V to 150V or an increase from 190V up to 250V.	Switching operation in line (lightning strokes), change-over to emergency generating sets. Faults in power systems.	Malfunctioning of control systems. Loss of information.
NSG 204		50V/Div.  4 ms/Div.	Rated voltage: 5 ... 220VDC Rated current: 10 A Interruption time: 1 ... 2000 ms Time between two cycles: 0,2 ... 10 s	This modul permits the practical simulation of power interruption of external DC power supplies how they are generated through switching of DC power supplies. This unit can also be used for tests of the regulation characteristics of power supply units.	Interruption of the internal mains operation of an apparatus.	Influence on automatic control systems. E. g. motor control systems, switching regulators, lift control systems.
NSG 222		200V/Div.  5 ns/Div.	Rise time: 5 ns ... 35 ns Pulse width: ca. 100 ns Pulse hights: 500; 1000; 1500V Phase angle: 80° ... 460° Static discharge: max. 7 kV / 150 pf Pulse energy: ~3 mJ Internal impedance: 150 Ω	This modul produces low energy pulses with a fast rise time and broad frequency spectrum. Pulse hights and rise time are variable. For simulation of static discharges a high voltage pistol can be connected. This interference will be wellknown in the practice specially in CMOS and TTL systems.	Electromechanical switching near out of the apparatus. Relay contacts, mechanical switches, such as used in typewriters or calculators. Static discharge by a man in dry atmosphere. Possible when leaving a car or when gliding down banisters.	Malfunctioning of fast IC logic circuits or even destruction of sensitive electronic circuits.
NSG 223		200V/Div.  1 µs/Div.	Rise time: ca. 0,3 µs Pulse width: 50 µs Pulse hights and internal impedance: sym. 50-1000V (5Ω) asym. 150-3000V (45Ω) «output» 150-3000V (45Ω) 250-5000V (125Ω) Phase angle: 80°-460° Pulse energy: ca. 2 J	This modul superposes high energy pulses on the power line how they are produced by switching electrical equipment. Such pulses have energy of several J and pulse-hights of several kV. The rise time is several kV / us. The variable pulses can be feed symmetrically or asymmetrically.	High voltage current breakers, switching contactors or thyristors, switching out of inductances, lightning strokes.	Destruction of semiconductors, such as diodes, Zener diodes, transistors, etc. Malfunctions of logic circuits, secondary effects caused by production of sparks.
NSG 224		500V/Div.  500 ns/Div.	Rise time: 25; 35; 100 ns Pulse hights: 490-2600V Pulse width: 1; 3; 10 µs Pulse energy: ca. 250 mJ Internal impedance: 50 Ω	This modul produces interference pulses, how they are generated through mechanical power switches. Pulses according to EEC standards com (78) 766 final and British STD 2793/01	Line-power switching-over operations with fast switches, such as mechanical switches or mercury switches.	Malfunctions or eventually destruction of semiconductor components.
NSG 226		200V/Div.  5 ns/Div.	Rise time: 5 ns ... 20 ns Pulse width: 100 ns Pulse hights: Sym.: 10; 20; 30V Asym.: 500; 1000; 1500V Internal impedance: 200 Ω Option: NSG 226/341 Pulse hights: Sym.: 100; 200; 300V Pulse width: 1 µs on 600 Ω line impedance	This modul simulates interference signals of data lines i. e. coupling of interference through parallel guided power cables.	Electromechanical switches near data lines. Relay contacts, mechanical switches, such as used in typewriters or calculators.	Malfunctions when transmitting data from central processing unit to terminal or inverse. Malfunctions also possible within the system itself.

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Interference simulators and high voltage generators NSG 500

Type	Picture	Interference pulsform	Technical datas	Practical interference	Noise source	Effects
NSG 500 A		50V/Div.  200 µs/Div.	Pulsetype 1+2 Rise time: 50 µs; 1 µs Pulse width: 2; 0,5; 0,05 ms Pulse hights: 30-300V Pulse energy: ca. 0,1; 1; 4 J Pulsetype 3+4 Rise time: 5 ns Pulse width: 100 ns Pulse hights: 50-200V	Interference peaks superposed on car power supply.	Electromechanical switches, switch off/on inductance i. e. window wipper, starter, etc.	Influence or destruction on electronic circuits, electronic ignition, micro-processors for electronic controlled fuel injection.
NSG 504		1000V/Div.  20 µs/Div.	Rise time: 1,2 µs Pulse width: 50 µs Pulse hights: 5,5 kV Pulse energy: 0,5; 2,5 J Internal impedance: 500 Ω	Slow, energyful standard interference pulses according to IEC publ. 60 and 255.4, SEN 361503 Pub.1	Power switchover at power plants. Switching of thyristors or contactors. Disconnection of large inductances, lightning.	Destruction of semiconductors like diodes, Zener dioden, transistors etc. Tests of insulation of components and equipment.
NSG 505		1000V/Div.  1 µs/Div.	Pulse hights: 200-2750V Pulse frequency: 1 MHz Amplitude fall time: to 1/2 after 6 µs Internal impedance: 200 Ω	Standardised decreasing interference cycles according to IEC 255.4; ANSI C. 37, 90 a-1974; IEEE Std 472-1974; SEN 361503 Pub.1	Decay oscillation of an L/C combination stimulated by a surgevoltage i. e.: transformer of an equipment or input filter.	Influence or destruction in electronic circuits.
NSG 522			Connecting network to NSG 505 Power voltage: Up to 470VAC 500 DC Rated current: 15 A 50/60 Hz / DC 8 A 400 Hz		Standardized decreasing interference oscillation superposed on power line.	

High voltage tester

		Technical datas	Application
NSG 509		Voltage: 0-2500V / 50 Hz 0-5000V / 50 Hz Rated current: 1- 10 mA 10-100 mA Burnout current shortly 200 mA Max. power: 500VA, shortly 1000VA	Equipment for high voltage tests as well for burnouts of insulation defects. Flashovers at bad insulations or leakage – air path too small selected can be found this way easily.

Line filters with multiple sockets FR 50, FR 100, FR 200

FR 50 **FR 100** **FR 200**		**Protects:** Measurements, instruments, counters, calculations- and data equipment from line interference **Suppresses:** Power switches, toolmachines officemachines, windingmachines **Technical datas** Voltage: Up to 250V 50/60 Hz Rated current: 1 to 10 A

Ask for the more detailed catalogue

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JULY 1, 1980

LINE-INTERFERENCE-SIMULATORS

NSG 200 D	Power Line Interference Simulator; Modular System Main Frame; 110/120 Volts, 60 Hz *	2200

Interference Generator Plug-In Units for NSG 200 D

NSG 203 A	Line Variation & Power Interrupt; 600 VAC max.	3500
NSG 204	DC Power Interrupt	3400
NSG 222	Fast Pulse & Static Discharge	3100
NSG 223	High Energy Interference Pulse Gen.	3500
NSG 224	Medium Energy Pulse Generator	3625
NSG 226	Data Line Interference Simulator	3000
NSG 226/341	(Same as NSG 226 except 600 ohms for telephone lines)	3500

NSG 422	Fast Pulse Interference Simulator	2600
NSG 500 A	Interference Simulator for Automotive Electronic Equipment including NSG 521; (VDE 0875/4.1)	9900
NSG 504	Impulse Test Voltage Generator; 5.5 kV; (IEC Pub.60)	4500
NSG 505	HF Pulse Test Voltage Generator; Damped Sinewave; 2.5 kV; corresponds to IEC, ANSI, & IEEE	5000
NSG 509	High Voltage Insulation Tester; 5000 VAC	3350
NSG 522	Coupling Network for use with NSG 505	2400

ACCESSORIES

NSG 312	Cable Assy. with Static Discharge Unit	150
NSG 321	Cable Assy. for Component Testing (1 pr.)	150
NSG 322	Cable Assy. for Ext. Autotransformer	100
NSG 323	Cable Assy. for Two Ext. Autotransformers	100
NSG 324	High Voltage Cable Assy.	100
NSG 326	Interconnecting Cable for NSG 522 (1 pr.)	100
NSG 331	Power Supply Cable Assy.	50
NSG 332	Coupling Clamp	350

* Models for 220/240 Volts, 50 Hz Available Upon Request